

**WHAT IS CLAIMED IS:**

1           1. For use in a code division multiple access communication system having a  
 2           source base station and a destination base station where a specified mobile station  
 3           establishes a connection with the source base station, a method comprising:  
 4                 initiating a handover of the connection involving the specified mobile station to  
 5           the destination base station; and  
 6                 establishing a start position of a synchronization search window for the specified  
 7           mobile station at a statistically-ascertained time position based on time positions at  
 8           which other mobile stations previously initiated handover from the source base station  
 9           to the destination base station.

1           2. The method of claim 1, wherein the statistically-ascertained time position is  
 2           an average time position at which other mobile stations previously initiated handover  
 3           from the source base station to the destination base station, and wherein the method  
 4           further comprises maintaining a filter which calculates a filter output value of an  
 5           average time position  $T_{\text{new}}$  for the specified mobile station using the expression

$$T_{\text{new}} = a * T_{\text{old}} + (1-a) * T_{\text{last}}$$

7           where:

8            $T_{\text{last}}$  is a time position found for a last mobile station which initiated handover  
 9           from the source base station to the destination base station prior to the specified mobile  
 10          station;

11           $T_{\text{old}}$  is an output value of the filter prior to the filter being updated with the time  
 12          position found for the last mobile station which initiated handover from the source base  
 13          station to the destination base station prior to the specified mobile station; and

14          a is a weighting factor.

1           3. The method of claim 1, further comprising maintaining the filter which  
 2           calculates the filter output value of the average time position  $T_{\text{new}}$  for the specified  
 3           mobile station at a radio network control node of the code division multiple access  
 4           communication system.

1           4. The method of claim 1, further comprising:  
 2                 determining the statistically-ascertained time position at a radio network  
 3           controller node; and

4 communicating the statistically-ascertained time position from the radio network  
5 controller node to the destination base station.

1 5. The method of claim 4, further comprising maintaining at the radio network  
2 control node a table which, for each of plural scenarios of source base stations and  
3 destination base stations, stores a corresponding scenario-specific statistically-  
4 ascertained time position.

1 6. The method of claim 1, wherein if the specified mobile station is not found at  
2 the start time position, the method further comprises attempting to find a transmission  
3 of the specified mobile station by looking a search window position which neighbors  
4 the start time position.

1 7. The method of claim 6, further comprising, with a failure to find the  
2 transmission of the specified mobile station, looking at progressively remote  
3 neighboring search window positions relative to the start time position.

1 8. The method of claim 6, if the specified mobile station is not found at the start  
2 time position, the method further comprises attempting to find the transmission of the  
3 specified mobile station by:

4 looking a first neighboring search window position on a first side of the start  
5 time position; and then, if necessary,

6 looking at a second neighboring search window position on a second side of the  
7 start time position.

1 9. The method of claim 8, wherein the first neighboring search window position  
2 on the first side of the start time position and the second neighboring search window  
3 position on the second side of the start time position comprise a set of most neighboring  
4 search window positions, and wherein, upon failure to find the transmission of the  
5 specified mobile station at either of the most neighboring search window positions,  
6 looking at progressively remote sets of neighboring search window positions.

1 10. The method of claim 1, further comprising synchronizing the destination  
2 base station with a transmission from the specified mobile station using the search

3 window to detect a transmission of the specified mobile station received at the  
4 destination base station.

1 11. A code division multiple access communication system comprising:  
2 a source base station;  
3 a destination base station having a synchronization searcher;  
4 a time position estimator which establishes a start position of a synchronization  
5 search window for the synchronization searcher of the destination base station, the  
6 synchronization search window being used to detect a transmission of a specified  
7 mobile station received at the destination base station during a handover of a connection  
8 involving the specified mobile station from a source base station to the destination base  
9 station, the time position estimator establishing the start position of the synchronization  
10 search window as a statistically-ascertained time position based on time positions at  
11 which other mobile stations previously initiated handover from the source base station  
12 to the destination base station.

1 12. The apparatus of claim 11, wherein the statistically-ascertained time position  
2 is an average time position at which other mobile stations previously initiated handover  
3 from the source base station to the destination base station, wherein the time position  
4 estimator maintains a filter which calculates a filter output value of the average time  
5 position  $T_{\text{new}}$  for the specified mobile station using the expression

$$T_{\text{new}} = a * T_{\text{old}} + (1-a) * T_{\text{last}}$$

7 where:

8  $T_{\text{last}}$  is a time position found for a last mobile station which initiated handover  
9 from the source base station to the destination base station prior to the specified mobile  
10 station;

11  $T_{\text{old}}$  is an output value of the filter prior to the filter being updated with the time  
12 position found for the last mobile station which initiated handover from the source base  
13 station to the destination base station prior to the specified mobile station; and

14 a is a weighting factor.

1 13. The apparatus of claim 11, wherein the time position estimator resides at a  
2 radio network control node of the code division multiple access communication system.

1           14. The apparatus of claim 13, wherein the radio network controller node  
2 communicates the start time position to the destination base station.

1           15. The apparatus of claim 11, wherein the time position estimator maintains a  
2 table which, for each of plural scenarios of source base stations and destination base  
3 stations, stores a corresponding scenario-specific start time position.

1           16. The apparatus of claim 1, wherein if the specified mobile station is not found  
2 at the start time position, the destination base station attempts to find a transmission of  
3 the specified mobile station by looking at a search window position which neighbors the  
4 start time position.

1           17. The apparatus of claim 16, wherein, with a failure to find the transmission of  
2 the specified mobile station, the destination base station looks at progressively remote  
3 neighboring search window positions relative to the start time position.

1           18. The apparatus of claim 16, wherein if the specified mobile station is not  
2 found at the start time position, the destination base station attempts to find the  
3 transmission of the specified mobile station by looking at a first neighboring search  
4 window position on a first side of the start time position, and then, if necessary, looking  
5 at a second neighboring search window position on a second side of the start time  
6 position.

1           19. The apparatus of claim 18, wherein the first neighboring search window  
2 position on the first side of the start time position and the second neighboring search  
3 window position on the second side of the start time position comprise a set of most  
4 neighboring search window positions, and wherein, upon failure to find the  
5 transmission of the specified mobile station at either of the most neighboring search  
6 window positions, the destination base station looks at progressively remote sets of  
7 neighboring search window positions.

1           20. The apparatus of claim 11, wherein the destination base station starts L1  
2 synchronization when the searcher sees a predetermined transmission from the specified  
3 mobile station.

21. A time position estimator situated at a node of code division multiple access communication system comprising, the time position estimator serving to establish a start position of a synchronization search window for a synchronization searcher of a destination base station, the synchronization search window being used to detect a transmission of a specified mobile station received at the destination base station during a handover of a connection involving the specified mobile station from a source base station to the destination base station, the time position estimator establishing the start position of the synchronization search window as a statistically-ascertained time position based on time positions at which other mobile stations previously initiated handover from the source base station to the destination base station..

22. The apparatus of claim 21, wherein the statistically-ascertained time position is an average time position at which other mobile stations previously initiated handover from the source base station to the destination base station, wherein the time position estimator maintains a filter which calculates a filter output value of the average time position  $T_{\text{new}}$  for the specified mobile station using the expression

$$T_{\text{new}} = a * T_{\text{old}} + (1-a) * T_{\text{last}}$$

where:

$T_{\text{last}}$  is a time position found for a last mobile station which initiated handover from the source base station to the destination base station prior to the specified mobile station;

$T_{\text{old}}$  is an output value of the filter prior to the filter being updated with the time position found for the last mobile station which initiated handover from the source base station to the destination base station prior to the specified mobile station; and

$a$  is a weighting factor.

23. The apparatus of claim 21, wherein the time position estimator resides at a radio network control node of the code division multiple access communication system.

24. The apparatus of claim 23, wherein the radio network controller node communicates the start time position to the destination base station.

25. The apparatus of claim 21, wherein the time position estimator maintains a table which, for each of plural scenarios of source base stations and destination base stations, stores a corresponding scenario-specific start time position.

1           26. A synchronization searcher for a destination base station of a code division  
2 multiple access communication system, the synchronization searcher using a  
3 synchronization search window to detect a transmission of a mobile station during a  
4 handover of a connection involving the mobile station to the destination base station,  
5 there being a start position of the synchronization search window, and wherein if the  
6 specified mobile station is not found at the start time position, the synchronization  
7 searcher attempts to find the transmission of the mobile station by looking at a search  
8 window position which neighbors the start time position.

1           27. The apparatus of claim 26, wherein, with a failure to find the transmission of  
2 the specified mobile station, the synchronization searcher looks at progressively remote  
3 neighboring search window positions relative to the start time position.

1           28. The apparatus of claim 26, wherein if the specified mobile station is not  
2 found at the start time position, the synchronization searcher attempts to find the  
3 transmission of the mobile station by looking at a first neighboring search window  
4 position on a first side of the start time position, and then, if necessary, looking at a  
5 second neighboring search window position on a second side of the start time position.

1           29. The apparatus of claim 28, wherein the first neighboring search window  
2 position on the first side of the start time position and the second neighboring search  
3 window position on the second side of the start time position comprise a set of most  
4 neighboring search window positions, and wherein, upon failure to find the  
5 transmission of the specified mobile station at either of the most neighboring search  
6 window positions, the synchronization searcher looks at progressively remote sets of  
7 neighboring search window positions.

1           30. The apparatus of claim 21, wherein the synchronization searcher starts L1  
2 synchronization upon seeing a predetermined transmission from the mobile station.